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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/829,140	04/21/2004	Regina B. Mueller-Mach	LUM-03-01-02	5367

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EXAMINER

CANNING, ANTHONY J.

ART UNIT	PAPER NUMBER
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2879

DATE MAILED: 11/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

34

Office Action Summary	Application No. 10/829,140	Applicant(s) MUELLER-MACH ET AL.	
	Examiner Anthony J. Canning	Art Unit 2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Acknowledgement of Amendment

The amendment to the instant application was entered on 6 September 2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-8 and 10-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Shimizu et al. (U.S. 6,069,440) (of record).

As to claim 1, Shimizu et al. disclose a structure comprising: a semiconductor light emitting device comprising a light emitting layer disposed between an n-type region and a p-type region (see Fig. 1; column 8, lines 35-44), the light emitting layer configured to emit light of a first wavelength (see Fig. 1, item 102; column 8, lines 45-55); and a cerium-doped garnet phosphor having a cerium concentration between about 4 mol % and about 8 mol % (column 11, lines 22-27, YAG is a garnet structure; column 12, lines 1-4; a content of 0.003-0.2 Ce is 0.3-20% mol% Ce).

As to claim 2, Shimizu et al. disclose the structure of claim 1. Shimizu et al. further disclose that the cerium-doped garnet phosphor has a cerium concentration of about 6 mol % (column 12, lines 1-4; a content of 0.003-0.2 Ce is 0.3-20% mol% Ce, which covers 6 mol %).

As to claim 4, Shimizu et al. disclose the structure of claim 1 wherein the cerium-doped garnet phosphor is $\text{Y}_3\text{Al}_5\text{O}_{12}:\text{Ce}^{3+}$ (column 3, lines 43-45; since the phosphor is activated it must be doped with Ce^{3+} , although Ce is written).

As to claim 5, Shimizu et al. disclose the structure of claim 1. Shimizu et al. further disclose that the cerium-doped garnet phosphor is disposed to absorb light of the first wavelength and capable of absorbing light of the first wavelength and emitting light of a second wavelength (column 8, lines 44-55).

As to claim 6, Shimizu et al. disclose the structure of claim 5. Shimizu et al. further disclose that the first wavelength is blue and the second wavelength ranges from green to yellow (column 10, lines 2-10).

As to claim 7, Shimizu et al. disclose the structure of claim 5. Shimizu et al. further disclose that the cerium-doped garnet phosphor is a first wavelength converting material, the structure further comprising a second wavelength-converting material, wherein the second wavelength-converting material is capable of absorbing light of one of the first wavelength and the second wavelength and emitting light of a third wavelength longer than the second wavelength (column 12, lines 48-61; column 13, lines 33-39; red light has a longer wavelength than blue light).

As to claim 8, Shimizu et al. disclose the structure of claim 7. Shimizu et al. further disclose that the third wavelength is red (column 12, lines 48-61; column 13, lines 33-39).

As to claim 10, Shimizu et al. disclose the structure of claim 1. Shimizu et al. further disclose that the semiconductor light-emitting device is a III-nitride light emitting diode (column 9, lines 35-47).

As to claim 11, Shimizu et al. disclose the structure of claim 1. Shimizu et al. further disclose that the cerium-doped garnet phosphor is coated on a top surface and a side surface of the light-emitting device (see Fig. 2, item 201; column 8, lines 56-59).

As to claim 12, Shimizu et al. disclose the structure of claim 1. Shimizu et al. further comprising: a pair of leads electrically connected to the light emitting device; and a lens disposed over the light emitting device (see Fig. 2, item 203; column 8, lines 59-64; see Fig. 1, item 104; column 16, lines 59-67).

As to claim 13, Shimizu et al. disclose the structure of claim 12. Shimizu et al. further disclose that the cerium-doped garnet phosphor is dispersed in an encapsulant disposed between the light emitting device and the lens (see Fig. 2, item 201; column 8, lines 56-59).

As to claim 14, Shimizu et al. disclose the structure of claim 1. Shimizu et al. further disclose that the cerium-doped garnet phosphor is spaced apart from the light-emitting device see Fig. 2, items 201 and 202; column 10, lines 49-65; the phosphor particles near the surface of the molding are spaced apart from the light-emitting device).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (U.S. 6,069,440) (of record) in view of Srivastava et al. (WO 00/33390).

As to claim 9, Shimizu et al. disclose the structure of claim 7. Shimizu et al. fail to disclose that the second wavelength converting material is one of $(\text{Ca}_{1-x}\text{Sr}_x)\text{S}:\text{Eu}^{2+}$ wherein $0 < x \leq 1$; $\text{CaS}:\text{Eu}^{2+}$; $\text{SrS}:\text{Eu}^{2+}$; $(\text{Sr}_{1-x-y}\text{Ba}_x\text{Ca}_y)_{2-z}\text{Si}_{5-a}\text{Al}_a\text{N}_{8-a}\text{O}_a:\text{Eu}_z^{2+}$ wherein $0 \leq a < 5$, $0 < x \leq 1$, $0 \leq y \leq 1$, and $0 < z \leq 1$; and $\text{Sr}_2\text{Si}_5\text{N}_8:\text{Eu}^{2+}$.

Srivastava et al. disclose a light-emitting structuring combining a cesium doped garnet phosphor and $\text{SrS}:\text{Eu}^{2+}$ (page 2, lines 13-18). Srivastava et al. further disclose that these phosphor combinations produce white light of pleasing characteristics, such as color temperature of 3000-6500° K, a color rendering index of about 83-87, and a device luminous efficacy of about 10-20 lumens per watt (see Abstract).

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the device of Shimizu et al. to include that the second wavelength converting material is $\text{SrS}:\text{Eu}^{2+}$, as taught by Srivastava et al., to produce white light of pleasing characteristics, such as color temperature of 3000-6500° K, a color rendering index of about 83-87, and a device luminous efficacy of about 10-20 lumens per watt.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al. (U.S. 6,069,440) (of record) in view of Sonobe (U.S. 6,921,928 B2).

As to claim 3, Shimizu et al. disclose the structure of claim 1. Shimizu et al. fail to disclose that the cerium-doped garnet phosphor is $(\text{Lu}_{1-x-y-a-b}\text{Y}_x\text{Gd}_y)_3(\text{Al}_{1-z}\text{Ga}_z)_5\text{O}_{12}:\text{Ce}_a\text{Pr}_b$ wherein $0 < x < 1$, $0 < y < 1$, $0 < z \leq 0.1$, $0 < a \leq 0.2$ and $0 < b \leq 0.1$.

Sonobe discloses a light-emitting device including that the cerium-doped garnet phosphor is $(\text{Lu}_{1-x-y-a-b}\text{Y}_x\text{Gd}_y)_3(\text{Al}_{1-z}\text{Ga}_z)_5\text{O}_{12}:\text{Ce}_a\text{Pr}_b$ wherein $0 < x < 1$, $0 < y < 1$, $0 < z \leq 0.1$, $0 < a \leq 0.2$ and $0 < b \leq 0.1$ (column 13, lines 55-67; column 14, lines 1-7). Sonobe further discloses that using this cerium-doped garnet phosphor will yield a light-emitting device having a high light efficiency with various emission wavelengths.

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the light-emitting device of Shimizu et al. to include that the cerium-doped garnet phosphor is $(\text{Lu}_{1-x-y-a-b}\text{Y}_x\text{Gd}_y)_3(\text{Al}_{1-z}\text{Ga}_z)_5\text{O}_{12}:\text{Ce}_a\text{Pr}_b$ wherein $0 < x < 1$, $0 < y < 1$, $0 < z \leq 0.1$, $0 < a \leq 0.2$ and $0 < b \leq 0.1$, as taught by Sonobe, to yield a light-emitting device having a high light efficiency with various emission wavelengths.

Response to Arguments

In regard to the applicant's argument that the breadth of cerium concentration range in Shimizu the examiner points to column 24, lines 11-25. Here the cerium concentration is 3%, which the examiner interprets as "about" 4%, which is on the same order of magnitude as the claimed cerium concentration range. Shimizu further discloses that when the cerium concentration falls less than the 0.3% the luminous intensity decreases because of the number of excited emission centers of photoluminescence due to Ce decreases, and when the content is greater than 20%, density quenching occurs. However, when the cerium concentration falls within 0.3-20% a luminous intensity of the light emitting diode is not less than 70% (column 12, lines 3-9).

Furthermore, to establish unexpected results over a claimed range, applicants should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. *In re Hill*, 284 F.2d 955, 128 USPQ 197 (CCPA 1960). An affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a *prima facie* case of obviousness. *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979). "A comparison of the claimed invention with the disclosure of each cited reference to determine the number of claim limitations in common with each reference, bearing in mind the relative importance of particular limitations, will usually yield the closest single prior art reference." *In re Merchant*, 575 F.2d 865, 868, 197 USPQ 785, 787 (CCPA 1978). Where the comparison is not identical with the reference disclosure, deviations therefrom should be explained, *In re Finley*, 174 F.2d 130, 81 USPQ 383 (CCPA 1949), and if not explained should be noted and evaluated, and if significant, explanation should be required. *In re Armstrong*, 280 F.2d 132, 126 USPQ 281 (CCPA 1960) (deviations from example were inconsequential).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony J. Canning whose telephone number is (571)-272-2486. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh D. Patel can be reached on (571)-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2879

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anthony Canning *ac*

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PRIMARY EXAMINER
11/20/06